would have required *less* excavation than the actual scheme? In the second place, as Mr. Login says, there would be locks at either end of the canal, which would be not only costly, but most inconvenient for ships in their passage. In the third place I doubt very much whether the whole stream of the eastern branch of the Nile would suffice to keep the canal and the great Bitter Lakes full. Some time ago, indeed, it was disputed whether the Mediterranean and the Red Sea *together*, pouring into the Bitter Lakes, would raise them to the level of the sea, owing to the influences of absorption and evaporation. The facts, however, proved to the contrary.

Still, Mr. Login is much more ambitious. With a *single* stream (that is to say, taking the eastern branch of the Nile at Damietta), less in volume than the present maritime canal, he proposes not only filling the Bitter Lakes to the level of the sea, but raising them to a level of at least twelve feet beyond it (thereby nearly doubling their present volume). Lastly, if the canal and Bitter Lakes could be filled sufficiently by the Nile spring the dry season, it would be overflowing during the floods, and if it could be filled only in the season of the floods, in the dry season it would be nearly empty.

As to the question of breakwaters at the Mediterranean end, Mr. Login rightly says that the annual deposit along the coast is hardly perceptible. I cannot see, therefore, what improvement the breakwaters he suggests would be upon the present ones, seeing that the easterly current *now* passes the extremity of the west pier with a speed of two or three miles an hour. He therefore not only proposes sending a current of at least five miles an hour for a considerable distance up the canal (as his plan infallibly must)—rendering it in strong prevailing winds almost impossible to get out from between his breakwaters—but also sacrificing a splendid harbour of 550 acres in extent.

I quite agree with Mr. Login in thinking that the Suez Canal will not only outlive all abuse, but become one of the greatest blessings to the civilised world.

Birkenhead, Nov. 11 EDW. RAE

The Poles of Mars

PERMIT me through your columns to inquire whether any experiments have been made, by polarisation, to test the statement that the light from the brilliant spots round the poles of Mars is *reflected?*

If nothing has yet been done, will some correspondent decide the point? G. W.

Nov. 25

Lectures to Ladies

IN the fourth number of NATURE there is a letter signed "M." on this subject, in which it is asserted that nearly all the women who most wish to attend these lectures, and who would most benefit by doing so, "are practically shut out from those at South Kensington and at University College, because none of the lectures are given in the evening." Your correspondent gives South Kensington credit for saying something about "persons engaged in tuition," but she adds that it is a mere mockery, as this very fact prevents their getting out in the daytime.

I can confidently say that the Committee for the Higher Education of Women most earnestly desires to interest and benefit those who are teaching others, and who feel the necessity of a better education for themselves; but I believe that the wider and more general object of the whole movement (of which this small committee for South Kensington and Chelsea forms a struggling and isolated element) is, not *so much* to improve those who are already engaged in teaching, as to elevate the tone of education amongst girls who will eventually be teachers, whether as governesses or as mothers.

This I think is enough reason for giving the lectures in the daytime, for it would be difficult for girls to come out alone to classes in the evening. Of course it is hoped that in time a regular system may be established for the training of teachers and students at once, but meanwhile we can but trust that even these weak forces, if they are rightly directed, may have some good effect, if it is only in awakening an interest in these subjects amongst those who can help.

It is very difficult, in London especially, to get at the class of students which we most wish to benefit. I think the fact is that, in London at least, schoolmistresses and governesses are, with a few exceptions, inclined to be narrow and conservative on the subject of educational improvements. If they would only come forward and interest themselves in the scheme their co-operation would be most valuable.

I hope that your correspondent "M." and others who feel as she does, may see this letter and will understand how difficult it is at the outset to satisfy so many conflicting requirements at once.

The course of lectures on Greek History and Literature which Mr. W. R. Kennedy is now giving on Saturdays at the South Kensington Museum is very thinly attended, which is exceedingly discouraging, especially as particular pains have been taken to make these lectures strictly educational, by means of questions set to be worked at by the students at home.

Brompton, Nov. 30 M. A. B.

The American Eclipse

DR. MORTON, Professor of Chemistry in the University of Pennsylvania, has kindly forwarded me photographs of the phenomena of totality. By combining in the stereoscope pairs of these, separated by intervals of about half-a-minute of time, the black globe of the moon appears projected far in front of the luminous prominences and the corona, which are, therefore, clearly seen to belong to the sun. Glass transparencies from negatives specially selected for this purpose, and appropriately mounted, would show these phenomena in a very striking manner.

WILLIAM CROOKES

NOTES

TO-NIGHT the physicists take their turn at the Royal Society, and the physical constitution of the sun will form one of the subjects dealt with.

WE believe that the communication to be read at the Royal Geographical Society on Monday will be one of great interest.

A PERIODICAL, after the model of the popular *Annales des Sciences Naturelles*, will be commenced in Paris at the beginning of the year. It is to be named the *Annales des Sciences Geologiques*. We are promised an important and fully illustrated memoir on the Geology of Palestine, by M. Lartet. The editors of the new journal will be M. Alphonse Milne-Edwards for the Palæontological, and M. Hebert for the Geological departments.

THE Swedish Academy of Sciences has just issued, under the title "Lefnadsteckningar öfver Kongl. Svenska Vetenshaps Akademicus efter År 1854 aflidna Ledamöter," the first number of a series of biographical notices of those of its members who have died since the year 1854. In the absence of the preface, which is deferred until the publication of the second number, we are unable to say whether all the members of the Academy are thought worthy a special biography, or only its most distinguished members. However this may be, we fear that very few of the twenty men, whose lives are recorded in this first number, are known to fame beyond the limits of their native land, notwithstanding that most of them have left behind them honourable records of scientific labour. We do not say all of them, because we notice an archbishop and a bishop, whose claims to admission to the Academy must, judging from their published works, have rested upon their social position or general attainments rather than upon their scientific labours.

WE have been favoured by Professor Newton, of Yale College, with the following notes as to the November star-shower:—"We were unfortunate here this year in observations upon the November meteors. Both nights, the 13th-14th, and 14th-15th, having been overcast. Through breaks in the clouds we saw a few stragglers, some of which were true November meteors, radiating from Leo, and leaving for an instant the soft trail peculiar to those bodies. But the number of meteors during the hour between three and four a.m. of Monday morning was probably not more than double or treble the usual number for any morning. The small part of the sky visible prevented any reliable estimate of numbers. Similar weather has rendered observation impossible at every station from which I have heard."

FROM a preliminary report made to the Association Scientifique de France, by M. C. Wolf, of the Imperial Observatory of Paris, we learn that the corps of observers appointed to watch the November star-shower was duly in the Marseilles district as previously arranged. On the night of the 12th, 210 stars were catalogued at Barcelonette, 116 at Marseilles, 120 at Montpellier, and only 31 at Orange (these last being merely sporadic). On the 13th, 130 stars were noticed at Orange. At this place the centre of the shower seems to have been much obscured by clouds, to the great disappointment of the observers. But elsewhere, especially at Turin, Marseilles, Valence, and Toulon, there was a magnificent display. The work of uniting the manifold results obtained, and deducing the distance of the bolides from the earth, as well as their radiant point, will shortly be commenced.

FATHER SECCHI writes to *Les Mondes* that the meteors of the 14th November were splendidly seen at Rome during half an hour when the sky was quite clear. Although this half-hour was not the time for the maximum display, no less than 183 meteors were observed. On the evening of the 13th, the meteors had already commenced to be visible in greater numbers than ordinary.

THE Rainfall Committee for 1860-69, in their report presented to the British Association at Exeter, remark that, as they are now on the eve of completing their decennial return for 1860-69, it behoves them to consider how they may best secure for the ensuing period the attainment of the objects for which they were originally constituted. They state that, even to those least acquainted with the subject, it will be apparent how much more desirable as well as easy it is to compare simultaneous observations than those wherein the observed values and their times are different. The number and distribution of the existing observation stations, though incomparably superior to that which existed some years since, is still capable of improvement; tracts of land, the rainfall of which as water-supply is of high importance, remaining without adequate observations, while other places are, if possible, too well provided. Mr. G. Symons requests us to announce that any persons who may be recording the fall of rain, or intending to record it, will oblige by forwarding to him, at 62, Camden Square, N.W., their names and addresses, in order that duplicate gauges may not be started unnecessarily near to them.

AT a recent meeting of the Ethnological Society some photographs of the great megalithic monuments in Wiltshire were exhibited. We understand that a scheme is now in progress to obtain funds for the purpose of procuring a series of photographic representations of the megalithic monuments found in England and France, and, if possible, in Europe and Algeria. Such a series, in which the compass-bearings and accurate dimensions would be given, would be invaluable to the student of archæology. Any of our readers interested in the work, who wish to know more of the details, are requested to communicate with the librarian, Royal Geographical Society, 15, Whitehall Place.

WE have been favoured by a correspondent with an account of a lecture given by Dr. Hector, at the New Zealand Institute, on the subject of Mining in New Zealand. The lecturer, in considering the mineral substances excavated from the superficial deposits, proceeded in the first place to give a short account of the building material. According to his statement, the number of building stones already worked in New Zealand is very large. They are generally divided into granites, limestones, and sandstones. There is a granite quarry at Adele Island, in Blind Bay; and the valuable stone also exists in unbounded quantities on the west coast of Otago, under circumstances most favourable for excavation and shipment. There is also very great variety in the colour and grain, whilst the quality is generally admitted to be excellent. Pure siliceous varieties of sandstones occur with the coal formations. The freestones are chiefly in the tertiary formation of New Zealand, from sandstone, to clay sandstones, and argillaceous sandy limestones, and pure limestone. The finest is the Oamaru stone, which, the lecturer stated, excelled most ordinary building stones in other parts of the world. There are no roofing-slate mines in New Zealand being worked, but there is no doubt that they exist. After reviewing the building materials, Dr. Hector passed on to the consideration of the valuable sands, the character and distribution of which were thoroughly explained.

WE have received the following note on the subject of the Holborn Valley Viaduct:—"From the position of the cracks in the columns it is evident that they have been bodily strained over towards the roadway. This may be accounted for by the great difference in weight between half the arch over the roadway and half the arch over the footway. Taking one girder and its load in each case, the weight of that over the roadway would be about eighty-five tons, and that over the footway only twenty-five tons; the additional weight over the column is eight tons, making therefore in all one hundred and eighteen tons supported by each column, and resting on a cap of the column which is five feet wide. Consequently, the centre of gravity of these weights is considerably out of the centre line of the column, and so tends to "cant" it over towards the roadway. Now, since a removal of the centre of pressure only one-sixth of the width of the cap from the centre line will double the strain on the edge nearest to the centre of pressure, the extra strain imposed on the side of the column nearest the roadway may be easily conceived. If in addition to this we assume the joints to be badly made (which appears probable), the cause of failure can no longer be a matter of surprise. For if the joints were made with convex faces no force would affect the outside filaments of the column, unless the whole column were crushed; but if concave, it is obvious that the edges would have to sustain the whole load. In the case of the Viaduct, as the load is unequally applied, the evil of the concave faces would be greatly exaggerated, and the column would necessarily be crushed on the faces nearest the roadway which support (as stated above) the greater weight. The report of the engineer may be shortly expected."

WE have received the following notes from our Dublin correspondent:—

Professor Jellett, B.D., has been almost unanimously elected as President of the Royal Irish Academy. One vote was recorded for Sir Robert Kane, F.R.S.

The Botanical Gardens at Glasnevin are known to the majority of the visitors to Dublin; they are beautifully situated on the banks of the little river Tolka, and contain a large collection of rare plants. Some years ago the Committee of Botany of the Royal Dublin Society, acting on the advice of the director of the gardens, purchased a large iron shed, in which they displayed portions of a collection of plants and their products useful to man. This structure was from the first quite unfit for preserving the valuable collection placed in it; the specimens were necessarily crowded together, and any arrangement was impossible. Still, the large numbers that visited this room to study the contents of the cases, and oftentimes to take notes of the history of the specimens, as told on their labels, testified to the great and intelligent interest that was taken in the collection by the public.

The special function of the Science and Art Department appears to be to provide for the improvement of the people in science and art, and they placed on the estimates for the four years between 1865 and 1869, a sum of 4,000*l.* for building a museum at the Botanical Gardens, close to the front entrance gate, through which so many thousand visitors pass in the course of each year. This sum, small though it may appear, would have been sufficient to have built and cased a large plain building, which would have contained all the present collection, and the additions to it, for many years; but though the money was voted by Parliament for several years, it was never applied to this purpose: and we think it but justice to the cause of science in Ireland, to call the attention of the Science and Art Department to this fact, and to urge them to have this sum inserted in the estimates for the coming year.

It is scarcely necessary to remind readers of NATURE of the importance of having the Museum of Economic Botany as close to the Botanical Gardens as possible, especially when, as in this case, these gardens are so largely resorted to; but it may not be amiss to inform them that the numerous members of the Royal Dublin Society have among themselves contributed, as donations, almost all the specimens in the present Economic Museum.

A local committee has been formed in Dublin of the "Veitch" Memorial. Dr. Moore, F.L.S., Director of the Botanical Gardens, Glasnevin, is the chairman, and a considerable number of subscriptions has been received.

AT a meeting of the Ashmolean Society, Oxford, Nov. 29th, Prof. Lawson read a short paper on Chlorophyll. Although he had made no original observations on this subject himself, he had no doubt but that a general view of what had been done recently by others would prove interesting to the Society. In speaking of the optical properties of chlorophyll, he called particular attention to the observations made on this branch of the subject by Professor Stokes; observations which had disproved the old theory that chlorophyll could be separated into two primary substances of a yellow and blue colour (the xanthophyll and cyanophyll of M. Frémy). He dwelt also upon the fact that Mr. H. L. Smith's careful comparison of the spectrum of the endochrom of diatoms with that of chlorophyll went far to prove the two substances to be identical. Chlorophyll had been formerly supposed to be a product of the vegetable kingdom only; but more recently a green colouring matter, closely allied to chlorophyll if not identical with it, had been detected in many of the lower forms of animal life. These discoveries illustrated in a striking manner how the supposed gaps between the two kingdoms were filled up.

AT Clare College, Cambridge, a scholarship, value 50*l.*, tenable for three years, will be given for proficiency in natural science. The examination, commencing March 30, 1870, will be in chemistry, chemical physics, comparative anatomy, physiology, and geology. Excellence in one or two of these subjects is preferred to a less perfect acquaintance with a greater number. Further particulars can be obtained from the tutor of the college.

THE *Pall Mall* announces the publication of the seventeenth volume of the Report of the Schools Inquiry Commission. It comprises reports on the schools in what the Commissioners have defined as the north-western district—namely, the counties of Lancashire and Cheshire.

WE understand that it is not the intention of the Government to fill up the vacancy in the curatorship of the Botanic Gardens at the Mauritius, caused by the death of Dr. Meller, but to promote the head-gardener to the highest post of authority.

DR. MCQUILLEN has exhibited in the Microscopical Department of the Academy of Natural Sciences at Philadelphia, slides of blood corpuscles of men and the lower animals, to which chloroform and nitrous oxide had been administered, to show that there was no morphological change in these bodies after administration of anæsthetics, as stated by certain physiologists in England. He showed specimens also in which, the blood corpuscles having been brought into actual contact with chloroform and ether, disintegration had taken place.

ON the same occasion, Mr. W. H. Walmsley called attention to the very great merits of glycerine jelly as a medium for the preservation of every description of objects, animal or vegetable. With this the most delicate tissues can be perfectly seen and examined; it preserves the colours, is very tenacious, and "its refractive powers are sufficient to render all inert structures transparent; while even the delicate lines on the scales of a mosquito's wing are as distinctly visible as if mounted dry." The formula for the preparation of this valuable jelly is thus set forth:—Take one package of Cox's gelatine, wash repeatedly in *cold* water, then place in a vessel and cover with *cold* water. Allow it to soak an hour or two, pour off superfluous water, add a pint of *boiling* water, place vessel on fire, and boil for ten or fifteen minutes; remove from fire, and when cool, but still fluid, add the white of an egg well beaten, replace on the fire, and boil until the albumen of the egg coagulates. Strain while hot through flannel, and add an equal portion by *measurement* of Bower's pure glycerine, and fifty drops of carbolic acid in solution: boil again for ten or fifteen minutes, and again strain through flannel; place in water bath, and evaporate to about one half; then filter (through cotton) into 2 oz. broad-mouthed phials. When thus made, the jelly is to be used in the mounting of objects as follows:—Place the stock bottle in a small jar of boiling water; when it becomes fluid, a sufficient quantity must be removed to the slide (previously warmed) with a glass rod; the object (previously soaked for some hours in equal parts of glycerine and distilled water, with a few drops of alcohol) is to be placed in the drop of fluid jelly, a cover applied, and a light weight placed upon it to exclude superfluous jelly. When cold, clean off the slide with a knife, wash in cold water, and finish with a ring of gold size or shellac varnish.

THE volume of the Memoirs of the Geological Survey of England and Wales, just published, consists of an important monograph on the Geology of the Carboniferous Limestone, Yordale Rocks, and Millstone Grit of North Derbyshire and the adjoining parts of Yorkshire, explanatory of sheets 81 N.E. and S.E., and 72 N.E. of the Survey Map. The work is by Messrs. A. H. Green, C. Le Neve Foster, and J. R. Dakyns; and contains an elaborate description of the geology of the district, illustrated with numerous important sections and a few views. Mr. Etheridge has contributed an Appendix and tabular list of fossils, with indications of the localities in which they occur.

ASTRONOMY

Spectroscopic Observations of the Sun

PROFESSOR C. A. Young, of Dartmouth, U.S., has communicated to the October number of the *Journal of the Franklin Institute* the following important observations of solar protuberances, which entirely endorse the work done by Mr. Lockyer in this country. We are enabled to place them thus early before our readers by the kindness of Professor Morton.

September 4th, 1869.—Prominences were noted on the sun's limb at 3 p.m. to-day in the following positions, angles reckoned from North point to the East:—

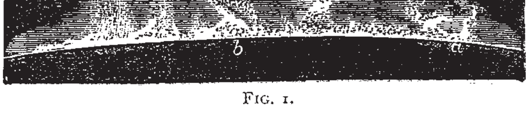

FIG. 1.

1. + 70° to + 100°, very straggling, not very bright.
2. − 10°, large and diffuse.
3. − 90°, small, but pretty bright.

September 13th, 1869.—The following protuberances were noted to-day.

1. Between + 80° and + 1100, a long straggling range of protuberances, whose form was as in Fig. 1. I dare not profess any